

**Abstract Of The Invention**

Disclosed are methods and materials for utilizing enzymes to act on metal ions in solution so that the ions are reduced to metal. Additionally disclosed is how to use enzymes to accumulate metal particles. The alteration of metal particles by enzymes interacting with the organic shell of the particles is also described. These methods enable a wide range of applications including sensitive detection of genes and proteins, use as probes for microscopy, nanofabrication, biosensors, and remediation.